a) a field-structured composite comprising a solid nonconducting medium, and an ordered aggregate structure of conducting magnetic particles within said medium;

b) electrodes positioned to allow the electrical resistance of said composite to be measured; and,

c) a coupling mechanism which couples the environmental parameter to said composite.

30. (New) The field-structured sensor of claim 29, further comprising environmental parameter isolation means such that the environmental parameter is the dominant influence affecting the electrical resistance of said composite.

31. (New) The field-structured sensor of claim 30, wherein the environmental parameter isolation means comprise thermal insulation.

32. (New) The field-structured sensor of claim 31, wherein the environmental parameter isolation means comprise a temperature controller.

33. (New) The field-structured sensor of claim 30, wherein the environmental parameter isolation means comprise a chemical barrier.

34. (New) The field-structured sensor of claim 30, wherein the environmental parameter isolation means comprise a substantially opaque barrier.

35. (New) The field-structured sensor of claim 30, wherein the environmental parameter isolation means comprise a substantially rigid enclosure.

36. (New) The field-structured sensor of claim 29, wherein the environmental parameter is stress applied to the sensor, and the coupling mechanism transmits stress applied to the sensor to said composite.

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37. (New) The field-structured sensor of claim 30, wherein the environmental parameter is stress applied to the sensor, and the coupling mechanism transmits stress applied to the sensor to said composite.

38. (New) The field-structured sensor of claim 37, wherein the stress applied to the sensor is generated by an accelerometer mass in functional relation to the coupling mechanism.

39. (New) The field-structured sensor of claim 38, wherein the electrodes are positioned so as to allow measurement of multiple axes of acceleration.

40. (New) The field-structured sensor of claim 29, wherein the environmental parameter is an applied magnetic field.

41. (New) The field-structured sensor of claim 30, wherein the environmental parameter is an applied magnetic field.

42. (New) The field-structured sensor of claim 29, wherein the environmental parameter is temperature, and the coupling mechanism comprises a strong thermal link to the immediate environment of the sensor.

43. (New) The field-structured sensor of claim 30, wherein the environmental parameter is temperature, and the coupling mechanism comprises a strong thermal link to the immediate environment of the sensor.

44. (New) The field-structured sensor of claim 29, wherein the environmental parameter is electromagnetic radiation incident on the sensor, the coupling mechanism comprises optics which direct said electromagnetic radiation onto the field-

structured composite, thereby heating the composite and changing its electrical conductivity.

45. (New) The field-structured sensor of claim 30, wherein the environmental parameter is electromagnetic radiation incident on the sensor, and the coupling mechanism comprises optics which direct said electromagnetic radiation onto the field-structured composite, thereby heating the composite and changing its electrical conductivity.

46. (New) The field-structured sensor of claim 29, wherein the environmental parameter is electromagnetic radiation incident on the sensor, the nonconducting medium is a semiconductor, the coupling mechanism comprises optics which direct said electromagnetic radiation onto the field-structured composite, generating electron-hole pairs within the nonconducting medium, thereby changing the electrical conductivity of the composite.

47. (New) The field-structured sensor of claim 30, wherein the environmental parameter is electromagnetic radiation incident on the sensor, the nonconducting medium is a semiconductor, the coupling mechanism comprises optics which direct said electromagnetic radiation onto the field-structured composite, generating electron-hole pairs within the nonconducting medium, thereby changing the electrical conductivity of the composite.

48. (New) The field-structured sensor of claim 29, wherein the environmental parameter is concentration of a selected chemical in a background carrier, and the coupling mechanism exposes the composite to said carrier.

49. (New) The field-structured sensor of claim 48, wherein the nonconducting medium changes volume when exposed to the selected chemical.